

Substitute the following set of claims, which included the amended claims and the claims which were not amended, on pages 29-44:

1. A multipath-combining subsystem for use with a spread-spectrum receiver for receiving a spread-spectrum signal arriving at different times from a plurality of paths, with the spread-spectrum signal having a plurality of packets with each packet having a header followed by a data portion, with the header including a header-chip-sequence signal, and with the data portion including a data-symbol-sequence signal, with each data symbol of the data-symbol-sequence signal spread-spectrum processed by a data-chip-sequence signal, said multipath-combining subsystem comprising:

matched-filter means, coupled to said spread-spectrum receiver, having a first impulse response matched to the header-chip-sequence signal of the header embedded in the spread-spectrum signal, for detecting, within a packet and for each path of the spread-spectrum signal, each match of the header-chip-sequence signal with the first impulse response, with a time difference between receiving each path of the spread-spectrum signal greater than a time of each chip of the header-chip-sequence signal and greater than a time of each chip of the data-chip-sequence signal, and for outputting, responsive to a detected match having a correspondence between the header-chip-sequence signal and the first impulse response above a header

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threshold, a header detection signal having an in-phase-header amplitude and a quadrature-phase-header amplitude and a respective chip location;

header-memory means, coupled to said matched-filter means, for storing the in-phase-header amplitude and the quadrature-phase-header amplitude of each header-detection signal and the respective chip location of each header-detection signal;

said matched-filter means having a second impulse response matched to the data-chip-sequence signal of the data portion embedded in the spread-spectrum signal, for detecting, at the respective chip location of each header-detection signal for each path, each match of the data-chip-sequence signal with the second impulse response, and for outputting, responsive to each detected match, a data-detection signal having an in-phase-data amplitude and a quadrature-phase data amplitude; and

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combining means, coupled to said header-memory means and to said matched-filter means, for multiplying the in-phase-header amplitude and the quadrature-phase-header amplitude of each header-detection signal by the in-phase-data amplitude and the quadrature-phase-data amplitude of each data-detection signal at each corresponding chip location, respectively, thereby generating a plurality of in-phase-weighted elements and a plurality of quadrature-phase-weighted elements for each data symbol within the data portion, and for combining the plurality of in-phase-weighted elements and the plurality of quadrature-

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phase-weighted elements of a respective data symbol as a sum signal of the respective data symbol.

2. The multipath-combining subsystem as set forth in claim 1 wherein said combining means includes:

product means for multiplying the in-phase-header amplitude and the quadrature-phase-header amplitude of each header-detection signal by the in-phase-data amplitude and the quadrature-phase-data amplitude of each data-detection signal, at each corresponding chip location, respectively, thereby generating the plurality of in-phase-weighted elements and the plurality of quadrature-phase-weighted elements for each data symbol of the data-symbol-sequence signal;

a combiner memory for storing the plurality of in-phase-weighted elements and the plurality of quadrature-phase-weighted elements; and

15 adding means for adding each in-phase-weighted element of the plurality of in-phase-weighted elements, and for adding each quadrature-phase-weighted element of the plurality of quadrature-phase-weighted elements for each data symbol to generate the sum signal of the respective data symbol.

3. The multipath-combining subsystem as set forth in claim 1 further including:

a header-pattern generator, responsive to the header-detection signal, for generating a header pattern; and

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said matched-filter means, responsive to the header pattern, for detecting each match of the data-chip-sequence signal with the second impulse response.

4. The multipath-combining subsystem as set forth in claim  
3 wherein said combining means includes:

product means for multiplying the in-phase-header amplitude and the quadrature-phase-header amplitude of each header-detection signal by the in-phase-data amplitude and the quadrature-phase-data amplitude of each data-detection signal, at each corresponding chip location, respectively, thereby generating the plurality of in-phase-weighted elements and the plurality of quadrature-phase-weighted elements for each data symbol of the data-symbol-sequence signal;

a combiner memory for storing the plurality of in-phase-weighted elements and the plurality of quadrature-phase-weighted elements; and

adding means for adding each in-phase-weighted element of the plurality of in-phase-weighted elements, and for adding each quadrature-phase-weighted element of the plurality of quadrature-phase-weighted elements for each data symbol to generate the sum signal of the respective data symbol.

5. The multipath-combining subsystem as set forth in claim  
1 further including a demodulator, coupled to said combining  
means, for detecting data from the sum signal.

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1 further including:

a header-timing circuit for detecting, from a plurality of header-detection signals, a strongest header-detection signal and, responsive to the strongest header-detection signal, for outputting a packet-start signal; and

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said matched-filter means, responsive to the packet-start signal, for changing the first impulse response to the second impulse response.

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7. The multipath-combining subsystem as set forth in claim 1 wherein said matched-filter means includes:

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a header-matched filter, coupled to said spread-spectrum receiver, having the first impulse response matched to the header-chip-sequence signal of the header embedded in the spread-spectrum signal, for detecting, within each packet and for each path of the spread-spectrum signal, each match of the header-chip-sequence signal with the first impulse response, and for outputting, responsive to a detected match having a level of correspondence above the header threshold, the header-detection signal having the in-phase-header amplitude and the quadrature-phase-header amplitude and a respective chip location; and

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a data-matched filter, having the second impulse response matched to the data-chip-sequence signal of the data portion embedded in the spread-spectrum signal, for detecting, at the respective chip location of each header-detection signal

for each path, each match of the data-chip-sequence signal with the second impulse response, and for outputting, responsive to each detected match, the in-phase-data amplitude and the quadrature-phase-data amplitude of the data-detection signal.

8. The multipath-combining subsystem as set forth in claim 1 wherein said matched-filter means includes:

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a programmable-matched filter, coupled to said spread-spectrum receiver, having the first impulse response initially matched to the header-chip-sequence signal of the header embedded in the spread-spectrum signal, for detecting, within each packet and for each path of the spread-spectrum signal, each match of the header-chip-sequence signal with the first impulse response, and for outputting, responsive to a detected match having a level of correspondence above the header threshold, a header detection signal having the in-phase-header amplitude and the quadrature-phase-header amplitude and a respective chip location; and

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said programmable-matched filter, having the second impulse response matched to the data-chip-sequence signal of the data portion embedded in the spread-spectrum signal, for detecting, at the respective chip location of each header-detection signal for each path, each match of the data-chip-sequence signal with the second impulse response, and for outputting, responsive to each detected match, the in-phase-data amplitude and the quadrature-phase-data amplitude of the data-

detection signal.

9. The multipath-combining subsystem as set forth in claim  
7 or 8 wherein said combining means includes:

product means for multiplying the header amplitude of  
each header-detection signal by the data amplitude of each data-  
detection signal, at each corresponding chip location,  
respectively, thereby generating the plurality of in-phase-  
weighted elements and the plurality of quadrature-phase-weighted  
elements for each data symbol of the data-symbol-sequence  
signal;

10 a combiner memory for storing the plurality of in-  
phase-weighted elements and the plurality of quadrature-phase-  
weighted elements; and

15 adding means for adding each in-phase-weighted element  
of the plurality of in-phase-weighted elements, and for adding  
each quadrature-phase-weighted element of the plurality of  
quadrature-phase-weighted elements for each data symbol to  
generate the sum signal of the respective data symbol.

10. A multipath-combining subsystem for use with a spread-  
spectrum receiver for receiving a spread-spectrum signal  
arriving at different times from a plurality of paths, with the  
spread-spectrum signal having a plurality of packets with each  
packet having a header followed by a data portion, with the  
header including a header-chip-sequence signal, and with the

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data portion including a data-symbol-sequence signal, with each data symbol of the data-symbol-sequence signal spread-spectrum processed by a data-chip-sequence signal, said multipath-combining subsystem comprising:

10 a header-matched filter, coupled to said spread-spectrum receiver, having a first impulse response matched to the header-chip-sequence signal of the header embedded in the spread-spectrum signal, for detecting, within a packet and for each path of the spread-spectrum signal, each match of the header-chip-sequence signal with the first impulse response, with a time difference between receiving each path of the spread-spectrum signal greater than a time of each chip of the header-chip-sequence signal and greater than a time of each chip of the data-chip-sequence signal, and for outputting, responsive to a detected match having a correspondence between the header-chip-sequence signal and the first impulse response above a header threshold, a header detection signal having an in-phase-header amplitude and a quadrature-phase-header amplitude and a respective chip location;

20 25 a header memory, coupled to said header-matched filter, for storing the in-phase-header amplitude and the quadrature-phase-header amplitude of each header-detection signal and the respective chip location of each header-detection signal;

30 a symbol-matched filter, having a second impulse response matched to the data-chip-sequence signal of the data

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portion embedded in the spread-spectrum signal, for detecting, at the respective chip location of each header-detection signal for each path, each match of the data-chip-sequence signal with the second impulse response, and for outputting, responsive to each detected match, a data-detection signal having an in-phase-data amplitude and a quadrature-phase data amplitude;

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a header-timing circuit, coupled to an output of said header-matched filter, for detecting, from a plurality of header-detection signals, a strongest header-detection signal and, responsive to the strongest header-detection signal, for outputting a packet-start signal;

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product means, coupled to an output of said header-matched filter and to an output of said header-timing circuit, for multiplying the in-phase-header amplitude and the quadrature-phase-header amplitude of each header-detection signal by the in-phase-data amplitude and the quadrature-phase-data amplitude of each data-detection signal, at each corresponding chip location, respectively, thereby generating the plurality of in-phase-weighted elements and the plurality of quadrature-phase-weighted elements for each data symbol of the data-symbol-sequence signal;

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adding means, coupled to an output of said product means, for adding the plurality of in-phase-weighted elements and the plurality of quadrature-phase-weighted elements for a respective data symbol to generate a sum signal of the respective data symbol;

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a combiner memory, coupled to an output of said adding means, for storing the sum signal; and

a data demodulator, coupled to said combiner memory, for detecting data from the sum signal.

11. A multipath-combining subsystem for use with a spread-spectrum receiver for receiving a spread-spectrum signal arriving at different times from a plurality of paths, with the spread-spectrum signal having a plurality of packets with each packet having a header followed by a data portion, with the header including a header-chip-sequence signal, and with the data portion including a data-symbol-sequence signal, with each data symbol of the data-symbol-sequence signal spread-spectrum processed by a data-chip-sequence signal, said multipath-combining subsystem comprising:

a programmable-matched filter, coupled to said spread-spectrum receiver, having a first impulse response matched to the header-chip-sequence signal of the header embedded in the spread-spectrum signal, for detecting, within a packet and for each path of the spread-spectrum signal, each match of the header-chip-sequence signal with the first impulse response, with a time difference between receiving each path of the spread-spectrum signal greater than a time of each chip of the header-chip-sequence signal and greater than a time of each chip of the data-chip-sequence signal, and for outputting, responsive to each detected match above a header threshold, an in-phase-

header amplitude and a quadrature-phase-header amplitude and a  
respective chip location;

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a header memory, coupled to said programmable-matched  
filter, for storing the in-phase-header amplitude and the  
quadrature-phase-header amplitude and the respective chip  
location of each header-detection signal;

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a header-timing circuit, coupled to an output of said  
programmable-matched filter, for detecting, from a plurality of  
header-detection signals, a strongest header-detection signal  
and, responsive to the strongest header-detection signal, for  
outputting a packet-start signal;

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said programmable-matched filter, responsive to the  
packet-start signal, for changing the first impulse response to  
a second impulse response, the second impulse response matched  
to the data-chip-sequence signal of the data portion embedded in  
the spread-spectrum signal, for detecting, at the respective  
chip location of each in-phase-header-detection signal and of  
each quadrature-phase-header-detection signal for each path,  
each match of the data-chip-sequence signal with the second  
impulse response, and for outputting, responsive to each  
detected match, a data-detection signal having an in-phase-data  
amplitude and a quadrature-phase data amplitude;

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product means, coupled to an output of said header-  
matched filter and to an output of said header-timing circuit,  
for multiplying the in-phase-header amplitude and the  
quadrature-phase-header amplitude of each header-detection

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signal by the in-phase-data amplitude and the quadrature-phase-data amplitude of each data-detection signal, at each corresponding chip location, respectively, thereby generating the plurality of in-phase-weighted elements and the plurality of quadrature-phase-weighted elements for each data symbol of the data-symbol-sequence signal;

adding means, coupled to an output of said product means, for adding the plurality of in-phase-weighted elements and the plurality of quadrature-phase-weighted elements for a respective data symbol to generate a sum signal of the respective data symbol;

a combiner memory, coupled to an output of said adding means, for storing the sum signal; and

a data demodulator, coupled to said combiner memory, for detecting data from the sum signal.

12. A multipath-combining method for use with a spread-spectrum receiver for receiving a spread-spectrum signal arriving at different times from a plurality of paths, with the spread-spectrum signal having a plurality of packets with each packet having a header followed by a data portion, with the header including a header-chip-sequence signal, and with the data portion including a data-symbol-sequence signal, with each data symbol of the data-symbol-sequence signal spread-spectrum processed by a data-chip-sequence signal, said multipath-combining method comprising the steps of:

15                   a. detecting, with a first impulse response matched to the header-chip-sequence signal of the header embedded in the spread-spectrum signal, within a packet and for each path, each match of the header-chip-sequence signal with the first impulse response, with a time difference between receiving each path of the spread-spectrum signal greater than a time of each chip of the header-chip-sequence signal;

20                   b. outputting, in response to each detected match above a header threshold, a header-detection signal having an in-phase-header amplitude and a quadrature-phase-header amplitude and a respective chip location;

25                   c. storing the in-phase-header amplitude and the quadrature-phase-header amplitude and the respective chip location of each header-detection signal;

30                   d. detecting, with a second impulse response matched to the data-chip-sequence signal embedded in the data portion of the spread-spectrum signal, at the respective chip location of each header-detection signal for each path, each match of the data-chip-sequence signal with the second impulse response;

35                   e. outputting, responsive to each detected match, a data-detection signal having an in-phase-data amplitude and a quadrature-phase-data amplitude;

                         f. multiplying the in-phase-header amplitude and the quadrature-phase-header amplitude of each header-detection signal with the in-phase-data amplitude and the quadrature-phase-data amplitude of each data-detection-signal at each

corresponding chip location, respectively, thereby generating a plurality of in-phase-weighted elements and a plurality of quadrature-phase-weighted elements for each data symbol of the data-symbol-sequence signal; and

g. adding the plurality of in-phase-weighted elements and the plurality of quadrature-phase-weighted elements for a respective data symbol as a sum signal of the respective data symbol.

13. The multipath-combining method as set forth in claim 12, wherein the step of (c) storing includes the step of buffering a plurality of header-detection signals corresponding to the plurality of paths.

14. The multipath-combining method as set forth in claim  
12 further including the step of generating a header pattern  
responsive to each occurrence of the header-detection signal  
within a frame of the header-chip-sequence signal.

15. The multipath-combining method as set forth in claim  
12 further including the step of detecting data from the sum  
signal.

16. The multipath-combining method as set forth in claim  
12 further including the steps of:

h. detecting, from a plurality of header-detection

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signals within the packet, a strongest header-detection signal;  
and

i. outputting, responsive to the strongest header-detection signal, a packet-start signal.

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